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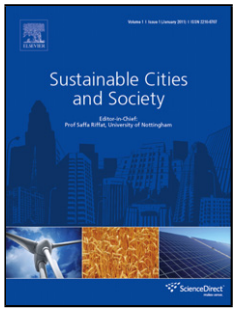

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Author: Angela J. Dean Kelly S. Fielding Jo Lindsay Fiona J. Newton Helen Ross

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HOW SOCIAL CAPITAL INFLUENCES COMMUNITY SUPPORT FOR ALTERNATIVE WATER SOURCES

Angela J. Dean[1,2,3,4]

Kelly S. Fielding[1,2]

Jo Lindsay[2,3]

Fiona J. Newton[5]

Helen Ross[6]

[1]School of Communications & Arts, The University of Queensland

[2]CRC for Water Sensitive Cities, Monash University

[3]School of Social Sciences, Monash University

[4]BehaviourWorks, Monash Sustainability Institute, Monash University

[5]Department of Marketing, Monash University

[6]School of Agriculture and Food Sciences, The University of Queensland

Author for correspondence

Dr Angela J Dean

School of Communication and Arts

The University of Queensland

St Lucia 4072 QLD

Australia

Email: a.dean@uq.edu.au

Highlights

- Social capital, measured by involvement in community organisations, was positively associated with community support for alternative water sources.
- This association was mediated greater by greater water-related social norms, water-related knowledge, and information recall.
- These pathways between community involvement and policy support were not consistently observed in all social groups.
- These mediation pathways were weaker in urban settings and in those who spoke a language other than English at home.

ABSTRACT

Ensuring future water security requires broad community support for changes in policy, practice, and technology, such as those involved in delivering alternative water schemes. Building community support for alternative water sources may involve a suite of engagement activities, ranging from information campaigns, through to grassroots and participatory approaches. There is increasing recognition that 'social capital'—the degree of social connectedness, trust, and shared values within a community—is important for building support for pro-environmental policies. However, little research has examined *how* social capital might influence support for alternative water schemes. We surveyed a representative sample of Australian adults (n=5194). Support for alternative water sources was examined using a series of questions focusing on stormwater harvesting, desalination, and recycled water. Involvement in community organisations (defined as participation or membership) was used as an indicator of social capital. Using a series of mediation analyses, we identified that community involvement is associated with support for alternative water sources, and that this effect is mediated by (i) stronger water-related social norms, (ii) greater water-related knowledge, and (iii) increased recall of water-related information. Our results also suggest that these indirect effects can be conditional upon location, employment status, life satisfaction, and language spoken within the home. These findings highlight the importance of social capital in building engagement in water-related issues, and specifically, building support for alternative water sources. In addition they highlight potential pathways for the association between social capital and support for alternative water sources for different social groups and communities.

Keywords: alternative water sources; recycled water; social capital; community support; knowledge and information; social norms

1. INTRODUCTION

1.1 Importance of community support for alternative water sources

Alternative sources of potable water—including treated wastewater, desalinated water, and harvested stormwater—provide a means of improving future water security, especially in the context of population growth, climate change, and urbanisation (McDonald et al., 2014; Vorosmarty et al., 2010). One of the challenges in expanding use of alternative water sources, however, is lack of widespread public support for these measures. A number of potable water recycling schemes around the world have faced public opposition that has prevented their successful introduction (Hurlimann & Dolnicar, 2010; Po et al., 2003). Communities have also expressed negative attitudes toward desalination schemes (King et al., 2012) and potable use of harvested stormwater (Leonard et al., 2015; Mankad & Walton, 2015). Many factors influence individual support for alternative water sources, including trust in water authorities and scientists, perceptions of risk and health concerns, perceptions of water quality, knowledge about alternative water, and perceived wider community support for alternative water schemes (Fielding et al., 2015; Leonard, et al., 2015; Mankad & Walton, 2015). The finding that perceived community support is an important determinant of individuals' own attitudes towards treated stormwater (Leonard, et al., 2015), suggests that an individual's social context—and the nature of their interactions with others—influences support for alternative water sources. Despite the recognition that our interactions with others can have a powerful influence on attitudes and behaviours (Allo & Loureiro, 2014; Dean et al., 2016; Jones et al., 2012), little research has examined these issues in the context of the critical issue of acceptance of alternative water sources. Therefore, this paper investigates how social factors such as interactions with others influence support for alternative water sources, using a social capital framework.

1.2 Social capital

Social capital is a broad construct: it has been described as the factors that 'glue' society together (Edwards, 2004), and defined as 'the social connectedness of a community that enables people, organisations, and communities to work together collaboratively for mutual benefit' (Edwards, 2004; Miller & Buys, 2008). Using the economic analogy of 'capital', social capital is conceptualised as a resource that can be accumulated or drawn upon in times of need (Flora & Flora, 2012). Moreover, because individuals can draw from social capital in their communities, it can operate at both an individual and community level (De Clercq et al., 2012). There are three key types of social capital (Poortinga, 2012; Quinn, 2008). Firstly, *bonding* social capital represents

close personal ties within groups, such as families and friends. In contrast, *bridging* social capital represents loose ties between people who may or may not be similar, such as workmates and acquaintances. Thirdly, *linking* social capital reflects relationships that reach across explicit, formal or institutionalised, power gradients in society (Poortinga, 2012; Quinn, 2008). Therefore, linking social capital connects dissimilar people and organisations across society, and provides access to new sets of resources.

Social capital is a complex concept, represented by diverse indicators (Edwards, 2004; The World Bank, 2015). Much social capital research focuses on 'community involvement'—participation and membership of community organisations (Putnam, 1995; Wollebaek & Selle, 2002). Community involvement is a key indicator of social capital: social capital encourages participation within communities, and participation builds social capital by connecting people to diverse networks as well as conveying multiple other benefits (Kim et al., 2006; Poortinga, 2012). Although much of the early research contends that face-to-face interactions are necessary for building social capital (Painter & Paxton, 2014; Putnam, 1995), it is now accepted that passive membership of an organisation may confer beneficial effects (Wollebaek & Selle, 2002). In the current study, we use community involvement as an indicator of social capital.

1.3 Is social capital associated with support for alternative water sources?

Many environmental initiatives aim to harness social capital to pursue environmental objectives (Allen et al., 2011; Selman, 2001). Research indicates that strong social networks are associated with greater support for pro-environmental policies. For example, individuals who report being influenced by a larger number of individuals or organisations are more likely to support alternative water sources (Dolnicar et al., 2011). Moreover, social capital has been associated with individual engagement in water issues (Dean, et al., 2016), greater perceived benefits of wetlands management (Jones, et al., 2012), and greater support for water funding initiatives (Jones et al., 2011).

Despite these associations, there is limited research examining *how* community involvement may actually influence support for policies. Involvement with a greater number of organisations, also called 'scope of participation' can increase likelihood of coming into contact with new issues and individuals from diverse backgrounds and viewpoints. (Wollebaek & Selle, 2002). These type of interactions may shape the way individuals perceive alternative water sources. This aligns with Bisung and Elliot (2014), who propose a

framework linking social capital with community management of water resources. They argue that social capital enhances management via its effects on collective action, knowledge, attitudes, and behaviours (Bisung & Elliott, 2014). It has also been suggested that community involvement may influence engagement in water-related issues via activating social norms about water (Dean, et al., 2016). This past research and theorising highlights that knowledge and social norms might be important variables in explaining the link between social capital (as measured by community involvement) and support for alternative water sources. Therefore, in this paper, we examine three potential pathways linking involvement in community organisations and support for alternative water sources. We propose that community involvement may be related to alternative water source support via: (i) activating social norms about water conservation; (ii) building water-related knowledge; and (iii) increasing recall of water-related information:

(i) Activating social norms: Social norms are standards or rules that regulate behaviour in a social setting; they are an inherent feature of social capital (Edwards, 2004). Group interactions allow sharing of diverse group norms and values (Edwards, 2004). This is important when considering that social norms exert a strong influence on environmental behaviours and support for pro-environmental policies (Allo & Loureiro, 2014; Fielding et al., 2010). It is possible that community involvement could generate opportunities for activating social norms about water issues, where greater involvement is associated with greater exposure to a range of social norms—including norms that are in favour of sustainable water management. To our knowledge, though, no research has examined this possibility. Therefore, we hypothesise that greater community involvement will be associated with greater support for alternative water sources via enhanced water-related social norms.

(ii) Building knowledge: Knowledge about water is associated with greater support for alternative water sources (Dolnicar, et al., 2011; Jeffrey & Jefferson, 2003). Knowledge can be shared through networks via formal mechanisms such as newsletters and events, or informal mechanisms such as word of mouth. Sharing knowledge has been considered an important benefit of social capital (Chen et al., 2014; Kim, et al., 2006; Lu et al., 2013). Knowledge sharing may also be enhanced by greater network diversity and greater confidence in information sources (Martini et al., 2014). Therefore, we hypothesise that greater community involvement will be associated with greater support for alternative water sources via greater water-related knowledge.

(iii) Increasing recall of water-related information: Information has an important influence on support for alternative water sources (Dolnicar et al., 2010; Fielding & Roiko, 2014). Community involvement may

increase exposure to information via a number of pathways. Greater community involvement is associated with greater media engagement (Gil de Zúñiga et al., 2012). Specifically, community involvement may also increase *recall* of water-related information: discussions about water may increase the salience of water-related issues, enhancing subsequent detection and recall of related information (Martini, et al., 2014). Importantly, a higher number of community ties has been associated with greater recall of health messages (Viswanath et al., 2006), potentially via community involvement 'priming' awareness of particular health issues (Viswanath, et al., 2006). Therefore, we hypothesise that community involvement will be related to greater support for alternative water sources via greater recall of water-related information.

Through examining these hypotheses the current study makes an important contribution to our understanding of support for alternative water sources. As noted previously, past research has identified a range of variables that predict support for alternative water sources but the focus in that research has been mainly on the role of individual factors such as health risk concerns (Dolnicar et al., 2011), knowledge (Dean et al., 2015, Dolnicar et al., 2011), or the level of trust that people have in scientists and government (Fielding et al., 2015, Nancarrow et al., 2007). The current study goes beyond this by focusing on how the social context—via experiences of social capital—relates to support for alternative water sources. Although previous studies have suggested that the social context and specifically social capital plays a role in support for various water management approaches, to our knowledge there has been no research that identifies the mechanisms that explain the relationship between social capital and policy support. Therefore, the current study makes an important contribution to the literature in not just establishing the link between social capital and alternative water source support but in also identifying underlying mechanisms that can explain how social capital links to support.

1.5 Who experiences the benefits from social capital?

It has been suggested that the individual benefits of social capital are not conferred evenly across social groups (Quinn, 2008). For example, individuals of higher social class may have access to different *types* of networks or may more effectively draw on their networks for greater private benefit (Horvat et al., 2003). This raises the question of whether the proposed pathways linking community involvement and support for alternative water sources occur equally across different subgroups in society. Research suggests that social capital may vary geographically, where urban residents have reported greater social agency and tolerance of diversity, but lower rates of neighbourhood connections and community trust (Onyx & Bullen, 2000). A second social group that

may exhibit differences in community networks and capacity to accrue social capital include those who are socially disenfranchised, such as the unemployed or those with low life satisfaction (Dolan, 2007). For this group, life circumstances may make it difficult to access certain network types, or draw on certain network benefits. A third group that may draw on different forms of social capital is immigrant communities (Kim, et al., 2006). It has been suggested that migrants may find it difficult to access mainstream networks, and prefer to rely on co-ethnic (i.e. ethnically similar) networks (Cederberg, 2012; Lu, et al., 2013). It is possible that ethnic minorities accrue different types of benefits from their networks, although it is not clear whether any potential differences are driven by cultural background, immigrant status, or language differences.

Acknowledging that social capital can differ across social groups raises the important question of whether the potential benefits of community involvement may also differ across these social groups. That is, is the relationship between community involvement and social norms, knowledge and information recall may be moderated by whether people live in rural or urban settings, whether they are disenfranchised, and their ethnicity. This critical question is examined in the current study, thereby acknowledging the inherent disparities that exist within the population and contributing to a more nuanced and comprehensive understanding of how social capital may be linked to alternative water support.

1.6 The current study

The current study aims to explore the relationship between community involvement and support for alternative water sources. Firstly, we will examine if there is a relationship between community involvement and support for alternative water sources. Secondly, we will examine whether this relationship is mediated by three key pathways: enhanced water-related social norms, increased water-related knowledge, and/or increased recall of water-related information (Figure 1). Thirdly, we will examine whether these relationships occur across different social strata. This will be assessed by examining whether the association between community involvement and the proposed mediators (social norms, knowledge, and information recall) is moderated by (i) location; (ii) psychosocial factors (unemployment, poor life satisfaction), and (iii) ethnicity factors (immigrant status, languages spoken at home, and ancestry) (Figure 1).

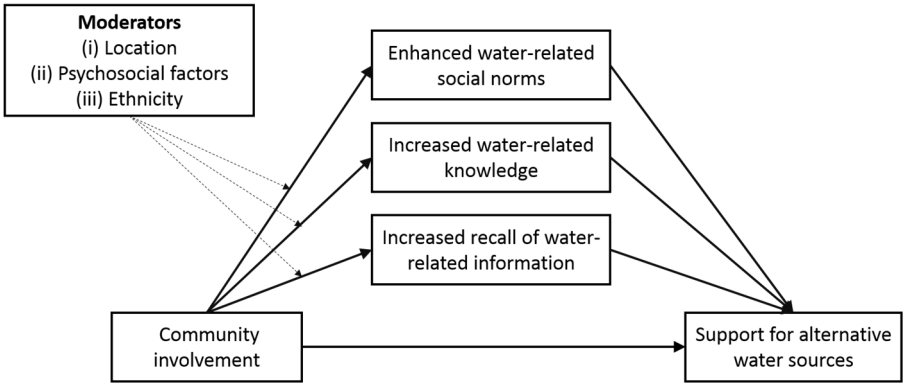

Figure 1. Direct and indirect pathways between community involvement and support for alternative water sources (solid lines). Dotted lines indicate potential moderators: (i) Location (living in a major city); (ii) Psychosocial factors (unemployment, and life satisfaction); and Ethnicity factors (immigrant status, language spoken at home, ancestry).

2. METHODS

2.1 Participants and procedure

The data for this study was drawn from a broader research study designed to examine Australians' water-related attitudes, behaviours and knowledge. Adults residing in all regions of Australia (n=5194) were recruited by a social research company utilizing a permission-based, online panel. The sampling frame targeted representative participation across gender, age, education, and state of residence. Eligible panel members were invited to participate via email. The 25-minute, online survey was administered during February-March 2014. Institutional ethical clearance was obtained prior to study commencement.

2.2 Measures

2.2.1 Community involvement: eleven items adapted from the European Social Survey assessed whether respondents were a member of, or participated in, 11 different types of community organisation (e.g. sporting club, cultural organization, trade union) (European Social Survey, 2014). Responses indicating either membership or participation were summed to form a '*Community involvement'* score (range 0-11).

2.2.2 Support for alternative water sources: six items were adapted from previous research (Dolnicar and Schafer 2009, King et al., 2012, Marks et al., 2006) that gauged: willingness to use recycled water for drinking and non-drinking purposes, support for desalinated water for drinking and non-drinking purposes, and support for use of treated stormwater for drinking purposes and use of harvested stormwater for irrigation. These were

each rated on a 5-point scale (1='*do not support at all/unwilling*' to 5='*completely supportive/very willing*'). The mean of these items formed a '*Support for* a*lternative water sources*' score (range 1-5, Cronbach's α=0.73).

2.2.3 Mediators

The following mediators were assessed:

- *Social norms about water conservation*: a single question, adapted from previous research (Fielding et al., 2010), assessed whether the respondent believed that others in their community saved water around the home (5-point scale, 1='*never'* to 5='*always'*). This was used as a measure of '*Water-related social norms*' and is commonly used in the literature to measure descriptive norms (i.e. norms about what people actually do) (Fielding et al., 2010).
- *Water-related knowledge:* 15 items about the urban water cycle, water management, and impact of household activities on waterways were adapted from previous research (James et al., 2010). Fourteen items were rated on a 5-point scale (1='*strongly disagree*' to 5='*strongly agree*'). Eight items were coded such that the correct response was 'agree'/'strongly agree'; six items were reverse coded. Neutral responses ('don't know' or 'neither disagree or agree') were coded as incorrect. An additional multiple-choice item asked: 'Which of the following best represents your understanding of what a catchment is?'(a) The area that retains water like a wetland or a marsh; (b) All the land area that drains to a specific river or waterway (*correct*); (c) A reservoir that serves as a water source; (d) A small building where water is stored; (e) None of these; (f) Do not know. A '*Water Knowledge'* score was calculated as the number of items with a correct response (Range 0-15).
- *Recall of water-related information*: respondents were asked whether they had seen or heard any information about water from a range of sources in the last six months (yes/no): radio, television, newspapers, online news, water utility newsletter, water utility bill, water utility website, local government newsletter, and social media. The number of positive responses was summed to form a '*Recall of water-related information*' score (Range 1-9)

2.2.4 Moderators

- *Location:* Postcode was coded into five groups (major cities, inner regional, outer regional, remote, and very remote) using Australian Statistical Geography Standard-Remoteness structure (ABS, 2011). For analysis,

this was recoded as urban (major cities = yes) and non-urban (inner regional, outer regional, remote, and very remote).

- *Psychosocial factors* were assessed using two items. Employment status (nine response options e.g. employed, unemployed, retired, studying, keeping house). Those reporting being 'unemployed' were classified as unemployed. All other participants were coded as 'not unemployed'. Respondents were also asked how satisfied they were with nine aspects of their life (e.g. home, employment, financial situation, neighbourhood) (Wooden & Watson, 2007). These were rated on an 11-point scale (0='*Not at all satisfied*' to 10='*Completely satisfied*'). The mean was used to create a '*Life Satisfaction'* score (range 0-10, Cronbach's α=0.88).
- *Ethnicity factors:* were assessed with the following items: immigrant status (born in Australia, yes/no); ancestry (9 response options) recoded for analysis as northwest European ancestry (yes/no); and language other than English (LOTE) spoken at home (yes/no).

2.3 Statistical analysis

The first stage of analysis utilised multiple mediation analysis, using the SPSS macro 'PROCESS' Model 4 (Hayes, 2013). This procedure estimates total, direct and indirect effects of a predictor on a dependent variable via a mediator. We quantified the direct effect of community involvement on support for alternative water sources, and the indirect effects mediated by: water-related social norms; water-related knowledge; and recall of water-related information. Bootstrapping, which improves power by repeatedly resampling the data and generates bias-corrected confidence intervals, was used to test the significance of indirect effects (Hayes, 2013). The second stage of analysis examined conditional indirect effects, using moderated mediation (SPSS 'PROCESS' macro, Model 7) (Hayes, 2013). Analysis examined whether the relationship between community involvement and each of the three mediators, was conditional on (i.e. moderated by): (i) location; (ii) psychosocial factors (unemployment, life satisfaction); and ethnicity (ancestry, language spoken at home, immigrant status). Bootstrapping provides an index of moderated mediation for each mediator-moderator relationship. If zero is not present in the 95% bias-corrected confidence interval, the index of moderated mediation is considered significant. As recommended, we used 10000 bootstrapped samples for all analyses (Hayes, 2013). Age, gender, and education were included in all models as covariates to control for the influence of demographic factors on support for alternative water sources (Dolnicar & Schafer, 2009).

3. RESULTS

3.1 Sample characteristics

Respondents comprised a representative sample of 5194 Australian adults (mean age 46.9±16.3 years; 50.9% female). The majority of respondents lived in urban centres (77.3%), had qualifications beyond high school (69.1%), and were employed (54.0%) (Table S1). Respondents were involved in an average of 1.89 organisations (SD=2.43, Range= 0-11). One third of respondents (34.8%; 1805/5194) reported no community involvement; 38.9% (2020/5194) reported involvement in one or two organisations, and 26.3% (1368/5194) were involved in three or more organisations. The most frequently cited organisation was a sports/outdoor activities club (32.6%; 1578/5194), followed by religious organisations (21.9%; 1059/5194), and organisations for cultural activities or hobbies (21.1%; 1022/5194).

3.2 Mediation models

We observed a significant *total effect* of community involvement on support for alternative water sources (Effect=0.010; SE=0.004; t=2.187; $p<0.05$, 95%CI 0.001, 0.018). This was primarily due to the *indirect effect* of the mediators. In support of our hypotheses, analysis demonstrates that the relationship between community involvement and support for alternative water sources was significantly mediated by enhanced water-related norms, increased water-related knowledge, and increased recall of water-information (Table 1, Figure 2).

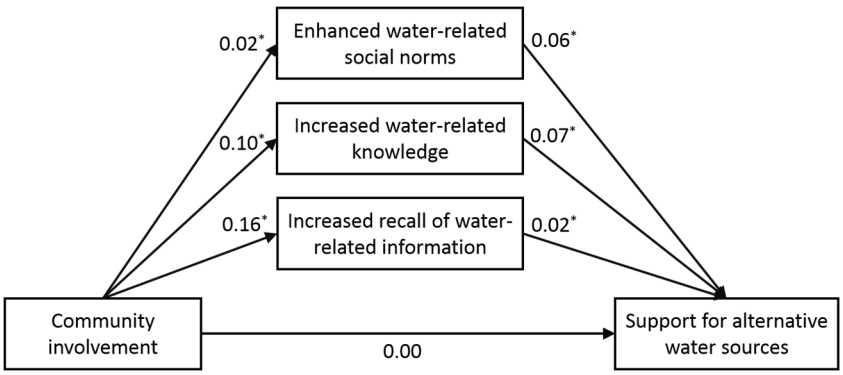

Figure 2. Coefficients indicating that the relationship between community involvement and support for alternative water sources is significantly mediated by information, knowledge, and social norms ($^{*}p< 0.001$)

After considering the effect of the mediators, no significant *direct effect* of community involvement on support for alternative water was observed (Effect= -0.002; SE=0.004; t=-0.581; $p=0.56$, 95%CI -0.010, 0.006), suggesting that our mediators fully mediate this effect. These findings remained the same when we examined

support for alternative water sources for drinking purposes and non-drinking purposes separately (data not shown).

3.3. Moderated mediation

3.3.1 Location

Location significantly moderated the relationship between community involvement and both water-related knowledge and recall of water-related information (Table 2): individuals living in major cities exhibited a weaker effect of community involvement on water related knowledge (Figure 3a) and recall of water-related information (Figure 3b). Location did not influence the effect of community involvement on water-related norms: both urban and non-urban residents demonstrated positive effects of community involvement on this pathway (Table 2, Table S2).

3.3.2 Psychosocial factors

The relationship between community involvement and social norms was moderated by life satisfaction (Table 2, Table S2): respondents with low satisfaction demonstrated a weak negative relationship between community involvement and water-related norms (Figure 3c). Low satisfaction did not moderate the relationship between community involvement and water-related knowledge or information recall. In contrast, the effect of community involvement on water-related knowledge was moderated by unemployment (Table 2): unemployed respondents exhibited a *stronger* relationship between community involvement and water-related knowledge than other respondents (Figure 3d). Unemployment did not moderate the relationship between community involvement and water-related norms or information recall.

3.3.3 Ethnicity factors

The relationship between community involvement and each of the three mediators (water-related social norms, water-related knowledge and recall of water-related information) was moderated by language (Table 2). Specifically, among those who spoke a language other than English at home, community involvement exhibited a negative relationship with water-related norms (Figure 3e), no relationship with water-related knowledge (Figure 3f); and a weak relationship between involvement and recall of water-related information (Figure 3g). Ancestry and immigrant status did not moderate any of the three pathways (Table 2).

Table 1. Regression coefficients, standard errors for the different steps of the multiple mediation model

	OUTCOMES											
	Water-related social norms			**Water-related knowledge**			**Recall of water-related information**			**Support for alternative water sources**		
PREDICTORS	B	SE	*p*	B	SE	*p*	B	SE	*p*	B	SE	*p*
Community involvement	0.020	0.005	0.000	0.102	0.021	0.000	0.156	0.009	0.000	-0.002	0.004	0.594
Sex	-0.158	0.026	0.000	0.152	0.102	0.137	0.119	0.044	0.007	0.073	0.019	0.000
Age	0.007	0.001	0.000	0.094	0.003	0.000	0.016	0.001	0.000	0.002	0.001	0.002
Education	0.035	0.016	0.031	0.622	0.064	0.000	0.110	0.028	0.000	0.035	0.012	0.005
Water-related social norms	-	-	-	-	-	-	-	-	-	0.060	0.011	0.000
Water-related knowledge	-	-	-	-	-	-	-	-	-	0.067	0.003	0.000
Recall of water-related information	-	-	-	-	-	-	-	-	-	0.023	0.006	0.000
	R^2 = 0.024; F=31.515; *p*<0.001 Effect=0.004; SE_b=0.001; 95%CI=0.002, 0.007			R^2 = 0.163; F=250.515 *p*<0.001 Effect=0.022; SE_b=0.005; 95%CI=0.013, 0.031			R^2 = 0.084; F=117.845; *p*<0.001 Effect=0.012; SE_b=0.003; 95%CI=0.006, 0.018			R^2 = 0.172; F=152.634; *p*<0.001 Effect=0.038; SE_b=0.006; 95%CI=0.026, 0.049		

Note: B = unstandardised coefficient; SE = standard error; Effect = standardised indirect effect based on 10000 bootstrapped samples, SE_b = the estimated standard error of the effect based on 10000 bootstrapped samples, 95%CI = confidence interval around the effect

Table 2. Index of moderated mediation and summary of moderated mediation models for each moderator

		OUTCOMES†														
MODERATORS		**Water-related social norms**				**Water-related knowledge**				**Water-related information**				**Support for alternative water**		
	Predictors	**Index**	**B**	**SE**	**CI**	**Index**	**B**	**SE**	**CI**	**Index**	**B**	**SE**	**CI**	**B**	**SE**	**CI**
Location	Involvement	-0.001	0.036**	0.014	0.009, 0.063	**-0.008**‡	0.209***	0.055	0.102, 0.316	**-0.002**‡	.209***	0.024	0.163, 0.256	-0.002	0.004	-0.010, 0.006
	Location		-0.068	0.040	-0.147, 0.020		-0.515**	0.159	-0.826, -0.204		.136*	0.069	0.002, 0.270			
	Involvement × location		-0.018	0.015	-0.047, 0.011		-0.122*	0.059	-0.238, -0.006		-.063*	0.023	-0.113, -0.013			
	Social norms													0.060***	0.011	0.039, 0.081
	Knowledge													0.067***	0.003	0.062, 0.072
	Information													0.023***	0.006	0.011, 0.036
Un-employment	Involvement	0.001	0.021**	0.006	0.136, 0.173	**0.023**‡	0.084***	0.022	0.040, 0.127	0.002	0.155***	0.010	0.136, 0.173	-.003	0.004	-0.012, 0.005
	Unemployment		-0.054	0.067	-0.183, 0.267		-0.697**	0.266	-1.219, -0.175		0.041	0.115	-0.183, 0.267			
	Involvement × unemployment		0.022	0.030	-0.092, 0.109		0.345**	0.118	0.113, 0.577		0.008	0.052	-0.092, 0.109			
	Social norms													0.061***	0.011	0.039, 0.082
	Knowledge													0.067***	0.003	0.061, 0.072
	Information													0.026***	0.006	0.013, 0.038
Life satisfaction	Involvement	**0.004**‡	-0.032	0.018	-0.068, 0.004	0.007	0.000	0.073	-0.144, 0.143	0.002	0.088**	0.032	0.026, 0.150	-0.002	0.004	-0.010, 0.006
	Satisfaction		0.088***	0.009	0.070, 0.105		0.303***	0.036	0.231, 0.374		0.072***	0.016	0.041, 0.103			
	Involvement × Satisfaction		0.007*	0.003	0.001, 0.012		0.011	0.011	-0.010, 0.032		0.009	0.005	0.000, 0.018			
	Social norms													0.060***	0.011	0.039, 0.081
	Knowledge													0.067***	0.003	0.062, 0.072
	Information													0.023***	0.006	0.011, 0.036
Ancestry	Involvement	0.001	0.014*	0.007	0.001, 0.027	0.005	0.087***	0.026	0.035, 0.138	0.001	0.144***	0.012	0.121, 0.166	-0.002	0.004	-0.010, 0.006
	Ancestry		-0.072*	0.033	-0.137, -0.006		1.551***	0.130	1.297, 1.805		0.221***	0.057	0.109, 0.333			
	Involvement × Ancestry		0.016	0.011	-0.005, 0.038		0.068	0.042	-0.015, 0.152		0.036	0.019	0.000, 0.073			
	Social norms													0.060	0.011	0.039, 0.081
	Knowledge													0.067	0.003	0.062, 0.072
	Information													0.023	0.006	0.011, 0.036
LOTE at home	Involvement	**-0.001**‡	0.029***	0.007	0.016, 0.043	**-0.012**‡	0.210***	0.028	0.155, 0.264	**-0.001**‡	0.177***	0.012	0.153, 0.201	-0.002	0.004	-0.010, 0.006
	LOTE		0.093*	0.044	0.008, 0.179		-1.127***	0.182	-1.463, -0.790		0.039***	0.075	-0.108, 0.186			
	Involvement × LOTE		-0.024*	0.011	-0.046, -0.003		-0.175***	0.043	-0.260, -0.090		-0.048***	0.019	-0.085, -0.011			
	Social norms													0.060***	0.011	0.039, 0.081
	Knowledge													0.067***	0.003	0.062, 0.072
	Information													0.023***	0.006	0.011, 0.036
Immigrant	Involvement	-0.001	0.026**	0.009	0.009, 0.044	0.002	0.086*	0.035	0.017, 0.155	0.000	0.161***	0.015	0.131, 0.191	-0.003	0.004	-0.011, 0.006
	immigrant		0.009	0.037	-0.064, 0.081		0.934***	0.145	0.649, 1.218		0.172**	0.063	0.049, 0.296			
	Involvement × Immigrant		-0.011	0.011	-0.033, 0.010		0.029	0.044	-0.056, 0.115		-0.008	0.019	-0.046, 0.029			
	Social norms													0.059	0.011	0.039, 0.080
	Knowledge													0.067	0.003	0.061, 0.072
	Information													0.023	0.006	0.010, 0.035

Index = bootstrapped index of moderated mediation; B=unstandardised coefficient; SE=standard error; LOTE = Language other than English

‡Index of bootstrapped moderated mediation is significant (also indicated in bold); †All analyses controlled for age, sex and education (data not shown)

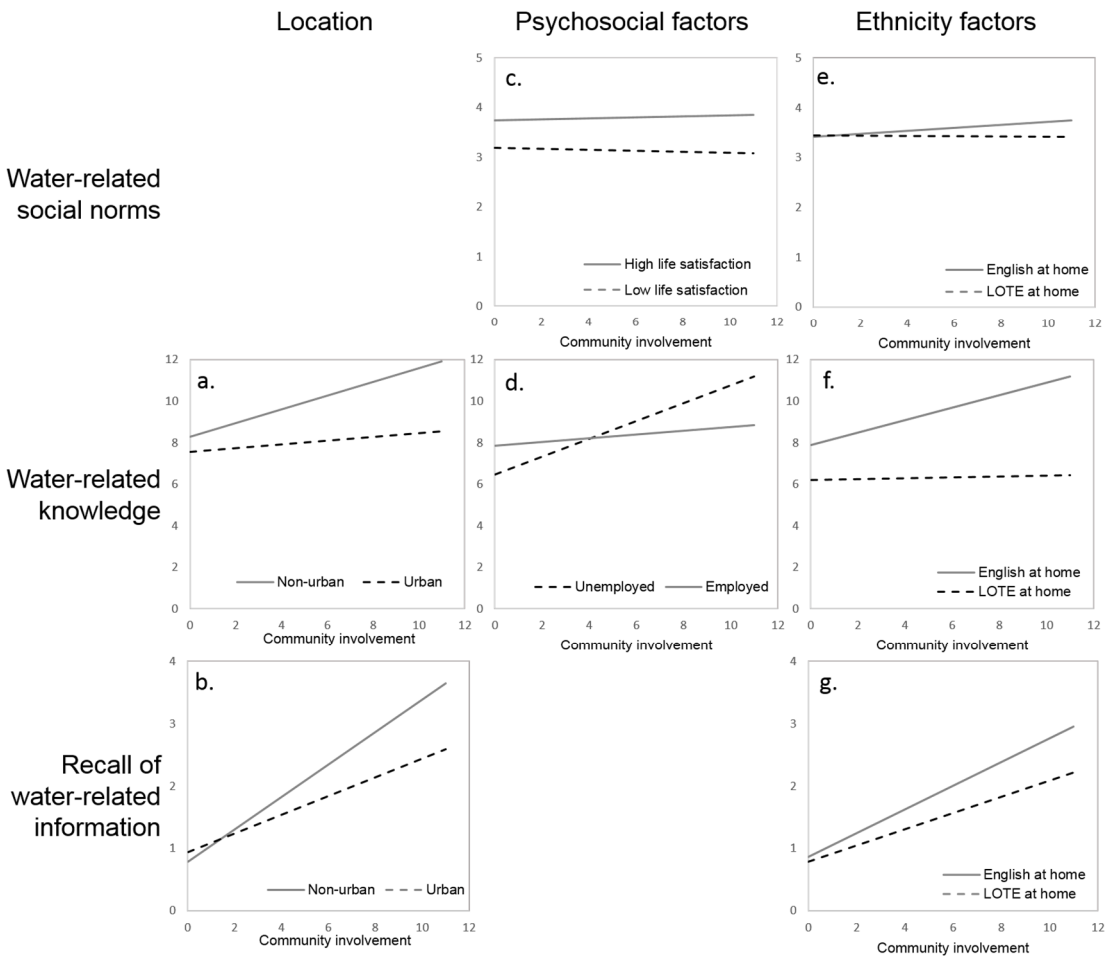

Figure 3. Significant interactions between moderators and mediators

4. DISCUSSION

We found that our indicator of social capital, involvement in community organisations, was associated with support for alternative water sources. Consistent with our hypotheses, this relationship was mediated by three key pathways: enhanced social norms about water, increased water-related knowledge; and increased recall of water-related information. These mediation pathways between community involvement and support for alternative water were influenced by location, psychosocial factors, and ethnicity. The extent to which social norms mediated the relationship between community involvement and support for alternative water sources was influenced by life satisfaction and language. For those with poor life satisfaction or who spoke a language other than English at home, social norms did not emerge as a significant mediator. The mediating effect of water-related knowledge was moderated by location, employment and language. This mediation pathway was weaker in urban residents, but was stronger in those who were unemployed; water-related knowledge did not mediate the relationship between community involvement and support in those who spoke a language other than English at home. The mediating effect of recall of water-related information was also mediated by location and language: this pathway between community involvement and support for alternative water was more weakly mediated in urban residents and those who spoke a language other than English at home.

Fostering involvement in community organisations can generate multiple benefits, such as improved health, wellbeing, and increased access to social support (Aslund et al., 2014; De Clercq, et al., 2012; Kim, et al., 2006). Our findings augment previous research showing that social capital is associated with support for water-related policies (Dolnicar, et al., 2011; Jones, et al., 2012; Jones, et al., 2011). In particular, we observed greater 'scope' of participation was associated with greater support for alternative water sources. This is consistent with research demonstrating that scope, rather than intensity, of participation, is a key contributor to social trust and civic engagement (Wollebaek & Selle, 2002). It is likely that greater scope of participation increases the likelihood of coming into contact with diverse individuals, thereby contributing to greater bridging or linking social capital.

Our findings demonstrate that community involvement may influence support for alternative water sources via three key pathways. Although our study was not designed to address all factors influencing support for alternative water use, our mediation model explained 17% of the variance in support for alternative water sources. Other factors that may contribute to variance in support for alternative water include perceptions of risk and institutional trust (Dolnicar, et al., 2011). The relationship between community involvement and enhanced social norms about water, while significant, was weak. It is possible that interactions with friends, families, and neighbours are stronger contributors to social norms than interactions with others in community organisations, but little research has examined this. Consistent with the view that the benefits of social capital include knowledge and information sharing (Chen, et al., 2014; Edwards, 2004; Lu, et al., 2013), community involvement was strongly associated with greater water-related knowledge and recall of water-related information. Although research demonstrates that information provision can enhance knowledge and support for alternative water sources (Dolnicar, et al., 2010; Fielding & Roiko, 2014), it is important to recognise that information detection and recall is not just a product of information exposure. Information is more likely to be transmitted and retained if it is relevant (de Vries et al., 2014). Our findings indicate that social factors, such as participation in community networks, are also associated with recall of information. As such, considering the social context for education and information initiatives may enhance their effectiveness (Dean, et al., 2016).

Both urban and non-urban respondents exhibited similar relationships between community involvement and activation of water-related social norms. However, for, respondents living in major cities, the relationship between community involvement and support for alternative water was only weakly mediated by water-related knowledge and information recall, reinforcing the role of location on the influence of community involvement. There are a number of possible explanations for this effect. The proposed pathway from community involvement to water-related knowledge and information recall may be weaker when existing salience of water issues is poorer, as might be found in urban settings.

For those living in cities, awareness of water scarcity may be constrained by distance from the land, and widespread use of reticulated water systems (Dean, et al., 2016). It is therefore possible that this diminished salience of water scarcity influences the relationship between community involvement and water-related knowledge and information recall. Another possible explanation for the effect on information recall relates to the nature of the urban environment and its impact on information processing. Urban living has been associated with impaired performance on certain types of cognitive tasks (Lederbogen et al., 2011; Linnell et al., 2013): urban residents have poorer 'attentional engagement' - being more likely to process *general* features of stimuli rather than engaging with more detailed content (Linnell, et al., 2013). This highlights the challenge of enhancing information detection and retention in urban settings.

Psychosocial factors had mixed effects on the relationship between community involvement and the three pathways to support for alternative water sources. Interestingly, those unemployed exhibited a stronger relationship between community involvement and water-related knowledge, and subsequent support for alternative water sources. Previous research has reported that unemployed individuals who were members of organisations reported better health than those who were unemployed, but not members of organisations (Aslund, et al., 2014). Our finding reinforces the role of community organisations in knowledge sharing, and suggests that community networks may adopt some of the functions of workplaces in transmitting knowledge. In contrast, in those with poor life satisfaction, community involvement exhibited a negative relationship with water-related norms. It has been argued that the benefits of group membership involve a sense of belonging and that these benefits accrue via a sense of connection other members (Sani et al., 2015; Wollebaek & Selle, 2002). It is possible that poor life satisfaction creates a barrier to this sense of connection, which then constrains activation of norms. Research indicates that life satisfaction is related to a sense of connection with community groups. For example, a cross-sectional health study reported that individuals with higher self-rated depressive symptoms reported identifying with fewer community groups (Sani, et al., 2015). Similarly, in online forum users, poorer life satisfaction was associated with lower sense of identifying with the forum (Pendry & Salvatore, 2015). Individuals are more receptive to information from sources aligned with their own individual or group identity (Schultz & Fielding, 2014); it is possible that transmission of social norms within groups is also more effective when individuals feel a sense of connection with the group.

Individuals from culturally diverse backgrounds may not experience full benefits of community involvement on pathways to support for alternative water sources. Our findings suggest that this is associated with language rather than immigrant status or cultural background. It is unclear whether those who speak languages other than English at home experience social exclusion and racism, or exhibit different social processes, such as preferring certain types of networks (Cederberg, 2012; Lu, et al., 2013). Both of these factors may result in limited exposure to new knowledge, information,

or values in the Australian context. Our findings reinforce the importance of addressing diverse language groups when building support for new policies, using approaches that provide information in multiple languages, or specifically target organisations with individuals who speak languages other than English in the home.

4.1 Implications for practice

Successful implementation of alternative water schemes typically involves managing perceptions of risk via effective framing of the issue and building trust, using strategies such as public visits to water treatment centres, and endorsement by public figures and community leaders (Guan & Toh, 2012; Water Corporation, 2013). Our findings align with past research showing that providing information (Dolnicar, et al., 2010; Fielding & Roiko, 2014) and communicating about social norms (de Groot & Schuitema, 2012) could cultivate support for recycled water schemes. Our findings also indicate that community networks may be 'catalysts of trust' (Wollebaek & Selle, 2002), generating policy support. While it is typically beyond the scope of water organisations to build social capital, many engagement activities, such as those supporting community participation, can utilise and enrich community networks. Engagement initiatives that provide opportunities for community members to meet, and to share concerns and ideas may cultivate social capital (Selman, 2001). For example, providing events in collaboration with community groups has been shown to strengthen networks within the community *and* build trust in water organisations (Allen, et al., 2011). Friend and Coutts (2006) describe how working with community groups and aligning recycled water activities with community needs can build support for recycled water schemes. Targeting disengaged individuals not involved in community groups is more challenging: initiatives should optimise relevance of information, especially in cities, consider barriers to participation, and ensure information is provided in diverse languages (Dean, et al., 2016).

One question raised by the current study is whether social capital may also play a role in relation to other environmental policy issues such as energy and transport policy. In light of our findings—that social capital is connected to alternative water source support via social norms, knowledge and information recall—the extent to which our model extends to other policy contexts may depend on whether the issues are on the political and media agenda and therefore part of community dialogue. It could be argued that water is a unique issue in Australia; many parts of Australia experienced the worst drought on record in the first decade of the 21st century and parts of Australia continue to experience drought or permanent declining rainfall. Indeed, surveys indicate that almost all Australians agree that management of water scarcity important (Dolnicar & Hurlimann, 2010). Because of this, it may be that community involvement plays a stronger role in relation to support for alternative water sources than it would for other policy issues, although this remains a question for future research.

Limitations

This study had a number of limitations. We used a single measure of social capital, community involvement. We were not able to examine to extent to which our indicator captured bonding, bridging or linking social capital, or factors such as motivation for involvement (e.g. social vs altruistic) or the nature of group interactions. It would be of interest for future research to examine these factors, and examine how community involvement interacts with other elements of social capital, such as institutional trust, in contributing to support for alternative water sources. Future research should also consider including more comprehensive measures of some of the key constructs included in the current study. In some cases we relied on single item measures, specifically for social norms and recall of water-related information, and we examined a limited set of psychosocial variables as moderators. The literature on social norms makes a distinction between two types of norms: injunctive (what people approve of) and descriptive (what people actually do) (Cialdini et al., 1990) and we only included a standard measure of the latter in the current study. It would be beneficial to consider whether both types of norms are implicated in the relationship between social capital and alternative water support; research has shown that perceiving conflict between injunctive and descriptive norms undermines attitudes and action (McDonald et al., 2013, Smith et al., 2012) and this could account for the relatively weak effects of social norms in our study.

Our reliance on a cross-sectional design means we are unable to draw conclusions about causality. Although analytical approaches using conditional processes, such as that utilised here, aim to provide greater rigour than just measuring associations (Hayes, 2013), causal relationships would be more appropriately examined using longitudinal or experimental designs. In particular, it would be useful to examine the effectiveness of engagement initiatives that aim to strengthen social capital. Finally, in the current study support for alternative water source was measured in the abstract, without providing contextual information about the schemes, for example, the cost of the scheme, or the level of water scarcity. Although our approach is consistent with many previous studies assessing support for alternative water sources (Dolnicar et al., 2010, Dolnicar and Schafer 2009, Marks et al., 2006), there is nevertheless a need for future studies that examine the role of social capital in the context of specific alternative water schemes.

Conclusions

Community involvement was associated with support for alternative water sources via indirect pathways. This relationship was mediated by stronger water-related norms, greater water-related knowledge, and increased recall of water-related information. These findings highlight the importance of considering the community context when building support for alternative water schemes, and raise the possibility that mobilising community networks may enhance policy

support. Importantly, the pathways from involvement to policy support were not consistently observed across all social groups: those in major cities, the socially disenfranchised, and those speaking other languages may require additional targeting to build support for alternative water sources.

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